EXPERIMENTS IN WINTER LAMB PRODUCTION

OHIO

Agricultural Experiment Station

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EXPERIMENTS IN WINTER LAMB PRODUCTION

PART I: RATIONS FOR EWES AND LAMBS
PART II: COST OF PRODUCTION

By J. W HAMMOND

INTRODUCTION

The hothouse lamb is a special product for which the demand at high prices is rather limited, yet the production of such lambs is an industry which has proved profitable on a number of Ohio farms. Many sections of Ohio not only have access to transportation facilities necessary to deliver the lambs to market in good condition, but also possess the sheep from which to raise the lambs, and the feeds to produce lambs of prime quality. The fact that the prices paid for hothouse lambs in the eastern cities the last year or two have been lower than those paid in some preceding years emphasizes the importance of keeping in mind the possibility of an over-production of this commodity. However, young lambs during the winter are a delicacy for which there doubtless always will be a good demand in western as well as in eastern cities, and the production of such lambs offers possibilities even though prices should not be maintained at the level of former years.

The term "hothouse lamb" frequently leads to the very erroneous impression that such a lamb is a delicate creature, requiring special care and artificially heated buildings. On the contrary, the hothouse lamb is very robust. Artificially heated, or even especially warm, buildings are not at all necessary. The term "hothouse" has probably been applied to such lambs because they are produced at a season when lambs are not ordinarily produced, and in this respect are comparable to the artificial or out-of-season products of hothouses or green-houses.

The present market for hothouse lambs is confined chiefly to the large eastern cities, principally New York, Boston and Washington, but it seems reasonable that a market for this product could be created in other cities farther west. Hothouse lambs are consumed by high class restaurants, hotels and clubs, and a few by private wealthy families. The eastern market demands that they be "hog dressed," i. e. all the viscera, except the heart, liver and kidneys removed, the feet removed, but the pelt and, frequently, the head left on. In the eastern markets they are usually sold by the carcass rather than by the pound. The season for hothouse lambs is between Thanksgiving and Easter, although the greatest demand does not begin until after New Years, and continues until about April 1, after which the price declines, owing to an increased supply at that time. A prime hothouse lamb must show quality, must be blocky and compactly built and must be fat. The weight demanded varies with the season. In the beginning of the season, 30 pounds dressed is a desirable weight, but as the season advances more weight is permissible, dressed lambs weighing as high as 40 pounds or more being acceptable.

There is also an extensive and increasing demand in the eastern and middle western lamb markets for early spring lambs, beginning as early as they can be put upon the market and continuing until the southern grass lambs appear. The demand is usually the greatest during Easter week, and for this reason such lambs are frequently termed "Easter" lambs. Lambs for this trade should be prime in quality and condition, and should weigh from 50 to 60 pounds alive. They are sold on the hoof, the price sometimes being as high as 15 to 17 cents per pound at the season of the greatest demand.

Group of hothouse lambs, raised from grade Delaine ewes and sired by Southdown ram.

Since 1911 the Ohio Experiment Station has been conducting some experimental work in the production of hothouse lambs at the Southeastern Test Farm, at Carpenter, and the data already secured are presented in this bulletin. Part I deals with a comparison of different rations for ewes and lambs, and Part II deals with the cost of producing hothouse lambs.

PART I

RATIONS FOR THE PRODUCTION OF WINTER LAMBS

During the winter of 1912-13, 122 winter lambs were raised and used in three different experiments to compare different grain rations for ewes and lambs. Forty of the oldest lambs were fattened and shipped to New York as hothouse lambs. The remaining younger lambs were reserved for experimental feeding the following summer, and were not fed quite as heavily as if they had been intended for hothouse lambs. The results thus secured from fattening hothouse or winter lambs will doubtless apply, in a measure at least, to the fattening of any kind of lambs.

Grade Delaine ewes from which hothouse lambs were raised.

RAISING THE LAMBS

The ewes from which the lambs were raised were principally grade Delaines averaging about 85 pounds in weight. There were also a few pure bred Delaine ewes in the flock. The lambs were sired by pure bred Southdown rams. Seventy-nine of the ewes were either young ewes or ewes which had raised hothouse lambs the previous winter. They were turned out on bluegrass pasture April 15, 1912, and breeding was begun May 20. The remaining 43 ewes had raised lambs during the spring and summer of 1912. The lambs were weaned July 8, and on July 23, these ewes were put with the breeding lot and bred for late fall and winter lambs. Beginning shortly before breeding was started and continuing throughout the breeding season, the ewes were fed about ¼ pound of corn per head daily to keep them gaining slightly in flesh. At frequent

intervals during the summer the ewes which were proved to be with lamb were removed from the flock, after which they received no feed, other than bluegrass pasture, until the lambs began to come in the fall.

EXPERIMENT I

OBJECT

The object of this experiment was to compare the efficiency, as measured by the rate and economy of gains produced by the lambs, of a ration composed of corn, oats, bran, oilmeal, alfalfa and silage, with one composed of corn, oilmeal, alfalfa and silage, for ewes raising hothouse lambs.

PLAN OF EXPERIMENT

Two lots, 12 ewes and 12 lambs in each lot, were used in this experiment, which lasted from December 19, 1912, to February 18, 1913, inclusive, a period of 62 days. On February 5, five lambs from Lot I and three lambs from Lot 2 were slaughtered and their dams removed from the experiment. On February 12, sufficient lambs of similar breeding and slightly younger, together with their dams, were added to bring the number of ewes and lambs in each lot back to twelve, as at the beginning. After February 18, lambs were slaughtered from both lots at frequent intervals and other lambs and ewes were added to take their places. It is doubtful if the ewes and lambs thus added were in the experiment long enough for the different rations fed to have much influence on either the rate or economy of gains. For this reason no account is taken of the results of the experiment after February 18, although it was continued until March 17, when the last lambs were slaughtered.

Animals used: A description of the ewes and lambs used is given on Page 201. The 24 ewes included in this experiment were the ones which lambed first. (For date of birth of lambs, see p. 217). In this, as in all other experiments reported in this bulletin, the two lots were made as nearly alike as possible with respect to age, weight, conformation and breeding.

Rations: The rations fed to the ewes were as follows:

Lot 1.—Corn, 4 parts; oilmeal, 1 part; alfalfa and silage.

Lot 2.—Corn, 5 parts; oats, 2 parts; bran, 2 parts; oilmeal, 1 part; alfalfa and silage.

The lambs in both lots were fed the same ration, corn and alfalfa. The lambs were fed apart from the ewes.

The different grains were so proportioned that the grain rations fed to each lot of ewes had approximately the same nutritive ratio. It was planned to feed the same amount of grain per head to the ewes and lambs in each lot. The lambs were fed all the hay they

would eat. The ewes in both lots were fed all the hay and silage they would consume without undue waste. Both ewes and lambs were fed as heavily on grain as they would stand, so as to keep the lambs growing as rapidly as possible. Table I shows the average daily ration consumed by the ewes and lambs in each lot by weekly periods and the average for the entire experiment.

TABLE I. EXPERIMENT I: Average daily ration consumed by ewes and lambs, by weekly periods

Date	Lot 1					Lot 2				
	Ewes			Lambs		Ewes			Lambs	
	Corn, 4; oil-meal, 1	Alfalfa	Silage	Corn	Alfalfa	Corn, 5; oats, 2; bran, 2; oil-meal, 1	Alfalfa	Silage	Corn	Alfalfa
Dec. 19-24	89	1 67	2 53	31	42	89	1 67	2 53	.31	42
" 25-31	1 00	1.12	3 49	38	36	1 00	1 12	3 58	38	.40
Jan. 1-7	1 00	93	3 54	.50	49	1 00	93	3 55	.50	.59
" 8-14	1 00	1 00	3 48	63	64	1 00	1 00	3 63	.63	.59
" 15-21	1 00	1 00	3 44	69	.71	1 00	1 00	3 55	.69	.73
" 22-28	1 00	1 00	3 52	.75	81	1 00	1 00	3 49	75	.81
" 29-Feb 4	1 00	.93	3 12	.91	.87	1 00	93	3 12	.91	.92
Feb. 5-11	96	.96	2 64	76	.80	98	98	3 07	91	85
" 12-18	1 00	1 00	3 02	92	.73	1 00	1 00	3 02	93	.77
Average .	.99	1 06	3 23	.65	65	99	1 06	3 30	.66	67

The average daily ration consumed by the ewes as shown by Table I is probably less than is ordinarily fed to ewes raising hot-house lambs, but it should be remembered that these were ewes averaging less than 90 pounds in weight (see Table II, page 204). Larger ewes would probably require more feed to produce the best results.

Feeds used: Both the corn and the hay fed were of good quality. Old process oilmeal (pea size) was used. The silage was made from corn of the Clarage variety which had been allowed to reach a good degree of maturity before cutting. It contained a large amount of grain and was of good quality. During part of the time it contained a very small percentage of soybeans.

Quarters: During the entire experiment the ewes and lambs were confined in pens, each containing approximately 150 square feet, inside a well ventilated barn with an abundance of sunlight from a southern exposure. Water was supplied to each lot in automatically regulated galvanized iron tanks. Each pen was provided with a "lamb creep" on one side, which furnished a place where the lambs could eat undisturbed by the ewes.

Method of feeding: The lambs were confined in the "lamb creeps" at feeding time until the ewes had finished eating. The lambs were fed all of the shelled corn and alfalfa hay they would eat

three times a day. All uneaten feed was removed from the troughs at each feed and fed and charged to the ewes. The daily ration fed to the ewes was given in two equal parts, morning and evening. The silage and grain were mixed together and fed first, followed by the hay. All uneaten feed was removed and weighed.

WEIGHTS AND GAINS

In all of the experiments reported in this bulletin, the initial weight was secured by taking the average of three weights, and the final weight was secured by taking the average of two weights taken on successive days.[1] The ewes and lambs were also weighed weekly during the experiment. All weights were taken in the morning before feed and water were given, the water having been withheld during the night previous to weighing. Table II shows the weekly weights and gains and the total gain made by the ewes and lambs in each lot. The ewes in Lot 2, fed corn, oats, bran and oilmeal made a slightly larger gain than did those in Lot 1, whose grain ration consisted of corn and oilmeal, but the lambs in Lot 1 made a larger gain than did those in Lot 2. This experiment does not show any striking difference between the two rations, so far as rate of gain is concerned, but since the gain on the lambs is more important and of more value than the gain on the ewes, what slight difference there is between these two grain rations, as shown by this experiment, is in favor of the one composed of corn and oilmeal.

TABLE II. EXPERIMENT I: Weekly weights and gains, and total gains.

Date	Lot 1						Lot 2					
	Ewes			Lambs			Ewes			Lambs		
	No.	Wt.	Gain	No.	Wt.	Gain	No.	Wt.	Gain	No.	Wt.	Gain
Dec. 18, 19, 20	12	1,017	..	12	325	..	12	1,038	..	12	330	..
" 25	12	1,050	33	12	355	30	12	1,045	7	12	355	25
Jan. 1	12	1,040	—10	12	385	30	12	1,040	—5	12	390	35
" 8	12	1,030	—10	12	425	40	12	1,045	5	12	430	40
" 15	12	1,020	—10	12	460	35	12	1,040	—5	12	465	35
" 22	12	1,040	20	12	500	40	12	1,060	20	12	500	35
" 29	12	1,045	5	12	535	35	12	1,055	—5	12	527.5	27.5
Feb. 5	12	1,045	..	12	565	30	12	1,080	25	12	560	32.5
" 5	* 7	585	..	* 7	271.5	..	* 9	745	..	* 9	397.5	..
" 12	7	600	15	7	305	33.5	9	770	25	9	430	32.5
" 12	**12	1 010	..	**12	521	..	**12	1,058	..	**12	558	..
" 17	....	.....	..	12	550	29	..	.....	..	12	585	27
" 17	....	.....	..	† 9	390	..	..	.....	..	† 7	320	..
" 19	12	1 035	25	9	400	10	12	1 085	27	7	325	5
Total gain	....	.....	68	....	...	312.5	....	.....	94	....	...	294.5
Av. daily gain per head	....	.....	.095	....	...	.441	.. .	.....	.129	....	...	.411

*On February 5, 5 lambs were slaughtered from Lot 1 and their dams taken out of the lot.
On February 5, 3 lambs were slaughtered from Lot 2 and their dams taken out of the lot.

**On February 12, 5 ewes and 5 lambs were added to Lot 1.
On February 12, 3 ewes and 3 lambs were added to Lot 2.

†On February 17, 3 lambs were slaughtered from Lot 1.
On February 17, 5 lambs were slaughtered from Lot 2.

[1] An exception to this is the final weight of Experiment I for which only one weight was taken.

COST OF GAINS

Table III shows the total amount and value of the feed fed to the ewes and lambs in each lot, and the cost of feed per pound of gain made by the lambs with feed at the prices given in the table. In calculating this table, the gain made by the ewes was credited at 3½ cents per pound. Table III shows that the lambs in Lot 1, whose dams were fed a grain ration of corn and oilmeal, not only made a slightly larger, but also a slightly cheaper gain than did those in Lot 2, whose dams were fed a grain ration of corn, oats, bran and oilmeal. The difference in the cost per pound of gain produced by the two rations was so slight, however, as to be of but little significance. Table III shows merely the cost of the gains made by the lambs during the experiment. The total cost of feed required for raising hothouse lambs is discussed in Part II of this bulletin.

TABLE III. EXPERIMENT I: Feed given to ewes and lambs; gains produced; cost of gains

Feeds and prices	Lot 1		Lot 2	
	Amount	Value	Amount	Value
	Lbs.		Lbs.	
Corn @ 56c per bushel	1,025.8	$10.26	835.25	$8.35
Oats @ 40c per bushel	.....	.....	143.90	1.80
Bran @ $24 per ton	.....	.....	143 90	1.73
Oilmeal @ $32 per ton	141.7	2.27	72.00	1.15
Alfalfa @ $12.50 per ton	1,242 0	7 76	1,256.00	7.85
Silage @ $3.50 per ton	2,456 0	4 30	2,510.00	4.39
Total cost of feed	.....	$24.59	.....	$25.27
Amount and value (@ 3½c per lb.) of gain made by ewes	68.0	2.38	94.00	3.29
Gain made by lambs	312.5	.....	294 50	.....
Total cost of feed, minus value of gain made by ewes	.....	22.21	.....	21.98
Cost of feed per pound of gain made by lambs	.....	.071	.....	.075

QUALITY OF FINISH

There was no appreciable difference in the degree of finish produced by the different rations. Both lots produced prime hothouse lambs.

EXPERIMENT II

OBJECT

The object of this experiment was to secure further evidence upon the problem under consideration in Experiment I.

PLAN OF EXPERIMENT

Experiment II was conducted very similarly to Experiment I. The same feeds were used in both experiments, except that in Experiment II the ewes were fed red clover instead of alfalfa during the last five weeks. The ewes used in both experiments were very

similar in age, type and breeding and were bred to the same rams. In Experiment I, the ewes had all lambed before the experiment began, while in Experiment II they did not begin to lamb until the second week of the experiment. (See Table V, p. 207). The ewes and lambs were confined in pens similar in size and location to those used in Experiment I. There were 11 ewes and their lambs in each lot in this experiment, which lasted from December 24, 1912, to March 28, 1913, inclusive, a period of 95 days. One lamb in Lot 1 died at birth, February 19, and the ewe was removed from the experiment.

Rations: The rations fed to the ewes were as follows:

Lot 1. Corn, 4 parts; oilmeal, 1 part; alfalfa, clover and silage.
Lot 2. Corn, 5 parts; oats, 2 parts; bran, 2 parts; oilmeal, 1 part; alfalfa, clover and silage.

The lambs in both lots were fed the same rations, corn and alfalfa, and were fed apart from the ewes.

Both ewes and lambs were fed in the same manner as in Experiment I, except that the lambs in Experiment II were not intended for hothouse lambs and were not forced as rapidly as were those in Experiment I. Table IV shows the average daily ration consumed by both ewes and lambs by weekly periods, and the average for the entire experiment.

TABLE IV. EXPERIMENT II: Average daily ration consumed by ewes and by lambs, by weekly periods

Date	Lot 1					Lot 2				
	Ewes			Lambs		Ewes			Lambs	
	Corn, 4; oil-meal, 1	Al-falfa*	Silage	Corn	Alfalfa	Corn, 5; oats, 2; bran, 2; oil-meal, 1	Al-falfa*	Silage	Corn	Alfalfa
Dec. 24-Dec. 31.	.5	.97	2.97	...	...	.5	.99	2.98	...	...
Jan. 1 Jan. 7.	.5	.94	2.67	...	...	.5	.96	3.05	...	...
" 8 " 14.	.5	.93	3.14	...	...	.5	.96	3.58	...	...
" 15 " 21.	.5	.94	3.12	...	...	.5	.97	3.57	...	...
" 22- " 28.	.52	.97	3.08	...	...	.52	.97	3.30	...	...
" 29-Feb. 4.	.67	.94	3.02	...	...	.67	.97	3.17	...	...
Feb. 5- " 11.	.67	.93	3.01	...	...	.67	.96	3.17	...	...
" 12- " 18.	.67	.96	3.22	.10	.10	.67	.98	3.32	.09	.09
" 19- " 25.	.67	1.00	3.40	.14	.10	.67	.99	3.25	.13	.09
" 26-Mch. 4.	.67	.96	3.55	.24	.16	.67	.96	3.26	.22	.14
Mch. 5- " 11.	.67	.95	3.59	.27	.23	.67	.96	3.34	.25	.18
" 12- " 18.	.67	.97	3.69	.32	.32	.67	.97	3 57	.29	.29
" 19- " 28.	.67	.96	3.90	.39	.28	.67	.96	3.79	.35	.26
Average.....	.60	.95	3.26	.25	.20	.60	.97	3.35	.23	.18

*Medium red clover hay was substituted for alfalfa during the last five weeks of the experiment.

WEIGHTS AND GAINS

Table V shows the weekly weights and gains and the total and average daily gain made by each lot. As in Experiment I, the lambs in Lot 1, whose dams were fed corn and oilmeal as a grain ration made slightly larger gains than did the lambs in Lot 2, whose dams were fed a grain ration consisting of corn, oats, bran, and oilmeal. The ewes in Lot 1 made a slight gain, while those in Lot 2 lost in weight during the experiment.

TABLE V. EXPERIMENT II: Weekly weights and gains, and total gains

Date	Lot 1						Lot 2					
	Ewes			Lambs			Ewes			Lambs		
	No.	Wt.	Gain	No.	Wt.	Gain*	No.	Wt.	Gain	No.	Wt.	Gain*
Dec. 23, 24, 25	11	1,030	..	..	...	..	11	1,028	..	..	...	..
Jan. 1	11	1,075	45	..	..	..	11	1,075	47	..	...	..
" 8	11	1,085	10	..	...	..	11	1,070	—5	1	10	10
" 15	11	1,107	22	..	...	..	11	1,082	12	1	13	3
" 22	11	1,080	—27	3	40	40	11	1,080	—2	2	25	12
" 29	11	1,015	—65	7	80	40	11	1,010	—70	7	85	60
Feb. 5	11	977	—38	8	103	23	11	955	—55	9	125	40
" 12	11	930	—47	11	150	47	11	882	—73	11	163	38
" 19	11	950	20	11	165.5	15.5	11	895	13	11	180	17
" 26	10	885†	1	10	190†	30	11	870	—25	11	210	30
Mch. 5	10	900	15	10	220	30	11	880	10	11	235	25
" 12	10	865	—35	10	245	25	11	885	5	11	255	20
" 19	10	890	25	10	275	30	11	880	—5	11	285	30
" 26	10	870	—20	10	300	25	11	885	5	11	320	35
" 28, 29	10	886	16	10	318	18	11	897	12	11	324	4
Birth weight of lambs born during the experiment**	..	.....	91.5	..	...	—91.5	..	.....	98.75	..	...	—98.75
Total gain	..	.....	13.5	..	...	232.0	..	.....	—32.25	..	...	225.25
Av. daily gain per head	..	.....	.013	..	...	.377	..	.....	—.031	..	...	.333

*The weekly gains in this column include the birth weights of the lambs born during the experiment, but the total gain and average daily gain per head is the gain actually produced during the experiment. See following note.

**A record was kept of the weight of each lamb at time of birth. The sum of these weights was added to the gain (or loss) made by the ewes and subtracted from the sum of the weekly gains made by the lambs, to get the actual gain made by the ewes and lambs respectively

†One lamb died at birth, weight 5.5 pounds. Ewe removed from lot, weight 66 pounds.

COST OF GAINS

Table VI shows the amount and value of the feed fed to each lot, and the cost of feed per pound of gain made by the lambs in each lot, with feed at the prices indicated in the table. In calculating the cost of gain produced by the lambs, the gain or loss made by the ewes is valued at 3½ cents per pound. Table VI shows that the lambs in Lot 1, whose dams were fed a grain ration of corn and oilmeal made a gain which cost 1.4 cents less per pound than the gain made by the lambs in Lot 2, whose dams were fed a grain ration of corn, oats, bran and oilmeal.

TABLE VI. EXPERIMENT II: Feed given to ewes and lambs; gains produced; cost of gains

Feeds and prices	Lot 1		Lot 2	
	Amount	Value	Amount	Value
	Lbs.		Lbs.	
Corn @ 56c per bushel	588.4	$5.88	418.9	$4.19
Oats @ 40c per bushel	.....	...	126.3	1.58
Bran @ $24 per ton	11.5*	.14	137.8	1 65
Oilmeal @ $32 per ton	121.3	1.94	63.2	1.01
Alfalfa @ $12.50 per ton	811 0	5.07	816 8	5.10
Clover @ $10 per ton	300.0	1.50	330.0	1.65
Silage @ $3.50 per ton	3,448.0	6.03	3,630.0	6.35
Total cost of feed	.....	$20.56	.....	$21.53
Amount and value (@ 3½c per pound) of gain or loss (—) made by ewes	13.5	.47	—32.25	1 13
Gain made by lambs	232.0	.....	225.25	.....
Total cost of feed, minus value of gain or plus value of loss made by ewes	.....	20.09	.....	22.06
Cost of feed per pound of gain made by lambs	.....	.087	.....	.101

*The lambs in both lots were fed a small amount of bran when they first began to eat grain.

EXPERIMENT III

OBJECT

The object of this experiment was to compare corn alone with a mixture of corn, oats, bran and oilmeal as grain rations for winter lambs.

PLAN OF EXPERIMENT

In Experiments I and II, the lambs in both lots in each experiment were fed alike and the ewes fed different rations, but in Experiment III both lots of ewes were fed alike and the lambs fed different rations.

Two lots, each composed of 38 ewes and their lambs were used in Experiment III, which lasted from December 24, 1912, to March 28, 1913, inclusive, a period of 95 days. On February 12, four ewes and their lambs were removed from each lot and put with the lambs in Experiment I, to fatten them more rapidly. On February 19, four more ewes and lambs were removed from each lot for the same purpose. At the time the experiment was begun, only about two-thirds of the ewes had lambed. The ewes in this experiment lambed later than those in Experiment I and earlier than those in Experiment II. The ewes used in this experiment were similar in every respect to those used in Experiments I and II (see p. 201) and were bred to the same rams. The same feeds were used and the same method of feeding was followed in Experiment III as in Experiment II, but the lambs were not intended for hothouse lambs and were not forced as rapidly as were the lambs in Experiment I.

Rations: The ewes in both lots were fed corn, oilmeal, clover, alfalfa and silage, the two lots being fed the same quantity of grain and as much hay and silage as they would eat. The rations fed the lambs were as follows:

Lot 1. Corn and alfalfa.
Lot 2. Corn, 5 parts; oats, 2 parts; bran, 2 parts; oilmeal, 1 part; and alfalfa.

It was planned to feed the lambs in the two lots the same amount of grain per head, and as much hay as they would eat. Table VII shows the average daily ration for both ewes and lambs by weekly periods, and the average for the entire experiment.

TABLE VII. EXPERIMENT III. Average daily ration consumed by ewes and lambs, by weekly periods

Date	Lot 1					Lot 2				
	Ewes			Lambs		Ewes			Lambs	
	Corn, 4; oil-meal, 1	Alfal-fa*	Silage	Corn	Hay	Corn, 4; oil-meal, 1	Alfal-fa*	Silage	Corn, 5; oats, 2; bran, 2; oil-meal, 1	Hay
Dec. 24-Dec. 31.	.75	1.00	3.53	.094	.039	.75	.99	3.48	.097	.039
Jan. 1-Jan. 7.	.75	.97	3.68	.167	.123	.75	.97	3.67	.144	.104
" 8- " 14.	.75	.98	3.74	.183	.131	.75	1.00	3.70	.167	.137
" 15- " 21.	.75	.98	3.80	.244	.211	.75	.97	3.71	.227	.185
" 22- " 28.	.75	.99	3.72	.243	.215	.75	.99	3.67	.231	.210
" 29-Feb. 4.	.75	.97	3.62	.307	.310	.75	.96	3.52	.291	.273
Feb. 5- " 11.	.75	.97	3.58	.386	.378	.75	.98	3.54	.385	.385
" 12- " 18.	.75	.97	3.38	.455	.442	.75	.97	3.40	.429	.393
" 19- " 25.	.75	.95	3.25	.422	.384	.75	.98	3.08	.387	.379
" 26-Mch. 4.	.75	.96	3.36	.444	.494	.75	.98	3.11	.435	.411
Mch. 5- " 11.	.75	.95	3.51	.444	.536	.75	.95	3.24	.449	.528
" 12- " 18.	.75	.93	3.61	.444	.548	.75	.93	3.43	.442	.546
" 19- " 28.	.75	.93	3.77	.517	.676	.75	.96	3.64	.484	.568
Average.....	.75	.97	3.60	.333	.343	.75	.97	3.50	.326	.325

*Medium red clover hay was substituted for alfalfa during the last five weeks of the experiment.

Quarters: Each lot of ewes and lambs was housed in a space 15 ft. x 16 ft. in a one story shed built on the west side of a storage barn. Numerous windows to the west and south gave abundant sunlight and ventilation. The two lots were changed from one pen to the other each week to overcome any advantage due to extra warmth or sunshine which might be possessed by the pen in the south end of the shed. On pleasant days the ewes and lambs had access to a yard 15 ft. x 20 ft. on the west side of each pen.

WEIGHTS AND GAINS

Table VIII shows the weekly weights and gains and the total gains made by both ewes and lambs. This table shows that the ewes in Lot 1 lost 63 pounds, while those in Lot 2 made a total gain

of 51 pounds, the two lots of ewes consuming the same kind and practically the same amount of feed. The lambs in Lot 1, fed corn alone made practically the same average daily gain as did those in Lot 2, fed the grain mixture of corn, oats, bran and oilmeal.

TABLE VIII. EXPERIMENT III. Weekly weights and gains, and total gains

Date	Lot 1						Lot 2					
	Ewes			Lambs			Ewes			Lambs		
	No.	Wt.	Gain	No.	Wt.	Gain*	No.	Wt.	Gain	No.	Wt.	Gain*
Dec. 23, 24, 25	38	3,392	.....	24	395	..	38	3,394	.....	22	356.5	.....
Jan. 1	38	3,400	8	28	480	85	38	3,405	11	28	475	118.5
" 8	38	3,280	—120	31	565	85	38	3,315	—90	29	535	60
" 15	38	3,200	—80	36	705	140	38	3,170	—145	39	725	190
" 22	38	3,145	—55	37	820	115	38	3,185	15	39	827.5	102 5
" 29	38	3,215	70	37	900	80	38	3,185	.....	39	907	79 5
Feb. 5	38	3,190	—25	37	987	87	38	3,160	—25	39	990	83
" 12	38	3,150	—40	37	1,075	88	38	3,180	20	39	1,085	95
" 12	34[1]	2,815	.....	33[1]	905	..	34[1]	2,780	.....	35[1]	910	.....
" 19	34	2,840	25	33	985	80	34	2,830	50	35	1,000	90
" 19	29[2]	2,435	.....	29[2]	815	..	30[2]	2,482	.....	32	830	.....
" 26	27[3]	2,275	20	27[3]	845	76	30	2,495	13	31	895	65
Mch. 5	27	2,305	30	27	910	65	30	2,520	25	31	960	65
" 12	27	2,360	55	27	970	60	30	2,550	30	31	1,025	65
" 19	27	2,340	—20	27	1,015	45	30	2,550	.....	31	1,080	55
" 28, 29	27	2,289	—51	26[4]	1,037	57	30	2,550	.....	31	1,152	72
Birth weight of lambs born during the experiment*	....	.....	120	....	.....	—120	....	.....	147	....	.....	—147
Gain	....	.....	—63	....	.....	943	....	.....	51	....	.....	993.5
Average daily gain per head	....	.....	.....	....	.....	.322	....	.....	....	....	.....	.315

[1] Four ewes and lambs were removed from each lot, February 12.
[2] Five ewes and 4 lambs, removed from Lot 1, and 4 ewes and lambs removed from Lot 2, Feb. 19.
[3] One lamb, weight 34 pounds, died February 22, and 1 lamb, weight 12 pounds, died February 26. The dams of these 2 lambs, weight 180 pounds, were removed February 26.
[4] One lamb, weight 35 pounds, died March 20.
* See note under Table V, page 207.

COST OF GAINS

Table IX shows the amount and cost of feed fed per pound of gain made by the lambs with feed at the prices indicated in the table. In calculating the cost of gain made by the lambs, the value of the gain or loss made by the ewes was valued at 3½ cents per pound. When this allowance is made, Table IX shows that the lambs in Lot 1 made slightly more expensive gains than did the lambs in Lot 2. If no allowance is made for the gain or loss made by the ewes, the lambs in Lot 1 made slightly cheaper gains than did those in Lot 2. In neither case is the difference great enough to indicate any striking difference in economy between the two rations. The cost of the grain fed to the lambs constitutes such a small percentage of the total cost of feed consumed by both ewes and lambs that it has but little influence on the cost per pound of gain made by the lambs.

TABLE IX. EXPERIMENT III. Feed given to ewes and lambs; gains produced; cost of gains

Feeds and prices	Lot 1		Lot 2	
	Amount	Value	Amount	Value
	Lbs.		Lbs.	
Corn @ 56c per bushel	2,873.8	$28.74	2,481.4	$24.81
Oats @ 40c per bushel	.....	.....	205 8	2 57
Bran @ $24.00 per ton	.....	.....	205.8	2.47
Oilmeal @ $32.00 per ton	476.1	7.62	594 6	9.51
Alfalfa @ $12.50 per ton	3,372 8	21.08	3,407.0	21.29
Clover @ $10 per ton	810.0	4.05	900.0	4.50
Silage @ $3.50 per ton	11,727.0	20.52	11,919.0	20.86
Total cost of feed	.....	$82.01	.....	$86.01
Amount and value (@ 3½ cents per pound) of gain or loss(—) made by ewes	—63.0	2.20	51.0	1.79
Gain made by lambs	943.0	.....	993.5	.....
Total cost of feed, minus value of gain or plus value of loss made by ewes	.....	84.21	.....	84.22
Cost of feed per pound of gain made by lambs	.....	.089	.....	.085

DEGREE OF FINISH

At the close of the experiment the lambs in Lot 1, fed corn alone as a concentrate, were not only heavier but were in a noticeably higher condition than were those in Lot 2, fed the mixed grain ration

CONCLUSIONS FROM EXPERIMENTS I, II AND III

In two of the experiments reported in this bulletin, a grain ration, consisting of corn and oilmeal fed in connection with silage, clover and alfalfa hay to ewes raising winter lambs, produced slightly larger and cheaper gains on the lambs than did a mixed grain ration of corn, oats, bran and oilmeal. In one experiment the ewes fed the corn, oats, bran and oilmeal ration made a larger gain than did those fed corn and oilmeal. In the second experiment, however, the ewes fed corn and oilmeal made a slight gain, while those fed corn, oats, bran and oilmeal lost in weight. While further work is necessary to secure conclusive evidence, the results of these two experiments indicate that when silage and clover or alfalfa constitute the roughage fed, a grain ration of corn, supplemented with some nitrogenous concentrate such as oilmeal, will produce just as large, and often cheaper gains than will a mixed grain ration composed of corn, oats, bran and oilmeal. The choice between a grain ration composed of corn and oilmeal and one composed of such a mixture of grains should depend upon convenience and upon the economy of the ration as determined by the relative prices of the different feeds. The corn and oilmeal ration is the more convenient and is usually the cheaper.

In the third experiment, a grain ration of corn, in connection with alfalfa, fed to winter lambs, not only produced a slightly larger gain on the lambs, but also produced a better finish than did a mixed grain ration of corn, oats, bran and oilmeal. The cost of feed

consumed per pound of gain produced by the lambs was practically the same for the two rations.

In these experiments oilmeal was used because at that time it was as cheap as or slightly cheaper than cottonseed meal. Cottonseed meal is usually cheaper than oilmeal and contains a higher percentage of protein, and is an excellent feed with which to balance a ration containing corn and corn silage, which usually are the cheapest feeds on corn belt farms. When sprinkled over or mixed with the silage it makes a very palatable ration, for which the ewes have a greater relish than they have for the silage alone.

PART II

COST OF FEEDS IN WINTER LAMB PRODUCTION

The cost of gains produced by hothouse lambs as shown in Part I of this bulletin has reference only to the cost of the gains made while the lambs were on experiment. The following pages show the entire cost of the feed required to produce these lots of lambs, including the cost of the feed required to maintain the ewes for a year. No account has been taken of numerous other items which entered into the cost of production, such as interest on the investment, depreciation in value of the ewe flock, ram service, labor, etc., nor has any credit been given for the value of the manure produced. No attempt has been made to determine the total cost of production, as the factors just mentioned are so variable that even if accurately determined in one particular case they would have but doubtful application in other cases. The data here presented represent a careful account of the amount of feed given, gains produced, and receipts from sales. They are presented to give the reader an idea of the possibilities of hothouse lamb production under Ohio farm conditions. In calculating the cost of production, an attempt has been made to value feeds at average prices for feeds on the farm in Ohio.

LAMBS PRODUCED IN 1911-12

The fourteen hothouse lambs born in 1911-12 were from grade Delaine ewes, and were sired by pure-bred Southdown rams. Two of the lambs died February 16.* Six of the lambs were slaughtered February 22, and the remaining six were slaughtered March 13. Table X shows the weight of the ewes and lambs and the amount of feed fed each week. The lambs were fed in a "lamb creep" apart from the ewes, and in addition to this they were allowed to eat hay and silage with the ewes, so that the lambs consumed slightly more and the ewes slightly less feed than is shown in Table X.

*The two lambs that died were apparently killed by a disease similar to forage poisoning or spinal meningitis which affects horses and which is supposed to be caused by a fungous growth on the forage. It was at first feared that these two deaths were caused directly by silage, but later deaths from apparently the same disease among sheep that were not fed silage led to the conclusion that the silage was not necessarily the carrier of any disease-producing organisms that may have caused the death of the lambs.

TABLE X. Weights and feed fed by weekly periods. 1911-12

Date	Ewes										Lambs					
			Feed fed					Average daily ration						Feed fed		
	No. in lot	Weight	Corn	Cotton-seed meal	Alfalfa	Mixed hay	Silage	Concentrates	Hay	Silage	No. in lot	Total weight	Average weight	Corn	Oilmeal	Alfalfa
Dec. 15	14	1,205.5	....	....	.....	..	...	...	....	....	14	287	20.50	7.5	1.0	18
" 22	14	1,210	49.6	33.4	159.5	..	252	.85	1.63	2.57	14	330	23 50	5.0	.5	9
" 29	14	1,229	33.5	33.5	140.0	..	392	.68	1.43	4.00	14	373	26.65	17 0	2.0	30
Jan. 5	14	1,230	35.0	35.0	140.0	..	410	.71	1.43	4 18	14	420	30.00	22 0	...	38
" 12	14	1,210	35.4	35.4	142.0	..	474	.72	1 45	4.84	14	475	33 93	31 0	...	60
" 19	14	1,250	36.6	36.6	140.0	..	490	.75	1.43	5 00	14	520	37.15	31 5	...	70
" 26	14	1,260	37.8	37 8	128.0	..	490	.77	1 31	5.00	14	570	40 71	37 5	...	70
Feb. 2	14	1,250	37.8	37.8	112.0	..	468	.77	1.14	4 78	14	610	43.57	38.5	...	70
" 9	14	1,255	37 8	38.4	112.0	..	493	.78	1 14	5 03	14	...	...	45 0	4 0	71
" 16	*14	1,305	46.4	32.4	128.0	..	380	.80	1 31	3.88	* 12	590	49 17	25 0	...	86
" 23	** 6	505	34.0	34.0	91.0	..	250	.73	1.03	2.84	** 6	290	48 37	48 0	...	102
Mch. 1	6	510	14.4	20.4	28.0	..	216	.83	.67	5.14	6	315	52.50	25.8	...	43
" 8	6	510	16.8	16.8	7.5	20	177	.80	.65	4.21	6	330	55 00	31 5	1 5	27
" 13	6	510	12.0	12.0	25.0	..	100	.67	.69	2.78	6	338.5	56 42	24.5	...	24.5
Total	....	.....	427.1	403.5	1,353.0	20	4,592	...	....	....	....	...	.....	389.8	9.0	718.5

*On February 16, two lambs, weighing 90 pounds, died of forage poisoning. On February 18 their dams, weighing 180 pounds were removed from the lot.
**On February 22, 6 lambs, weighing 343 pounds were slaughtered, and their dams, weighing 600 pounds, were removed from the lot.

INDIVIDUAL GAINS

Table XI shows the age when slaughtered and the daily gain made by each lamb from the time of birth until the time of slaughter. The gains shown in this table are those actually produced and do not include the birth weight of the lambs.

TABLE XI. Individual gains made by lambs, 1911-12.

No.	Date of birth	Date slaughtered	Age when slaughtered	Weight when slaughtered	Gain per day* from birth until slaughtered
			Days	Lbs.	Lbs.
39	Nov. 22	Feb. 22	92	62 50	.571
58	" 20	" "	94	65.00	.590
67	" 23	" "	91	58.25	.536
111	" 22	" "	92	51 25	.459
121	" 22	" "	92	52.50	.478
135	" 12	" "	102	53.50	.426
9	Dec. 3	Mch. 13	101	53 25	.428
37	" 9	" "	95	59 00	.537
110	Nov. 25	" "	109	56 00	.422
133	" 12	" "	122	58 25	.395
141	" 14	" "	120	54 00	.377
146	" 17	" "	117	58 00	.423
Average.....	.....	.....	102 25	56.80	.465

*In calculating the daily gain, the birth weight was subtracted from the weight when slaughtered, and the remainder divided by the age in days.

DRESSING PERCENTAGE

The lambs were sold to a Columbus hotel and were not "hog dressed," as is customary for eastern markets, but were dressed in the manner frequently employed in dressing lambs for the regular trade. The pelt, head and feet and all the viscera, except the heart, liver and kidneys were removed. The carcass was spread by "backsets," and the caul put on in the regular manner. The following table shows the live and dressed weight and the dressing percentage for each lamb.

TABLE XII: Live and dressed weights (cold) and dressing percentage of lambs, 1911-12.

No.	Live weight	Dressed weight	Dressing percentage
39	62.50	34.00	54.40
58	65.00	33.75	51 92
67	58.25	30.50	52.36
111	51.25	27.25	53.17
121	52.50	25 75	49.05
135	53.50	27.50	51.40
9	53 25	27.25	51.17
37	59.00	30.25	51.27
110	56.00	27.00	48.21
133	58 25	27.50	47 21
141	54 00	25.25	46 76
146	58.00	27.00	46.55
Total.....	681.50	343.00	.....
Average.....	56.80	28.58	50.33

TOTAL COST OF FEED, AND COST OF FEED PER POUND OF GAIN

In determining the cost of feed required to produce the lambs, account was taken not only of the amount of feed fed to the ewes and lambs while the ewes were raising the lambs, but also of the total amount of feed required to maintain the ewes from the time they were turned out to pasture one year to the corresponding time the following year. Since there was not more than two weeks difference in the time at which the ewes were turned out to pasture each year, the time included by the dates mentioned is practically a year. Table XIII shows the value of the total amount of feed fed, at ordinary farm prices for feeds, and the cost of feed fed per pound of live weight of lamb produced after deducting the value of the wool produced by the fourteen ewes.

TABLE XIII. Total amount and value of feed fed to ewes and lambs, 1911-12.

	Corn	Cottonseed meal	Alfalfa	Silage	Mixed hay
Feed fed to ewes, May 16 to December 14, 1912	581.2	22.4	432.9	.....	..
Feed fed to ewes and lambs, December 15 until lambs were slaughtered.	816.9	412.5	2,002.2	4,592	20
Feed fed to ewes from the time lambs were slaughtered until April 25, 1912.	233 5	58.7	428.9	1,417	..
Total feed fed to ewes and lambs.	1,631.6	493.6	2,864.0	6,009	20

DR.

1,631.6 pounds corn at 56c per bushel	$16.32	
493.6 pounds cottonseed meal at $32.00 per ton	7.90	
1.432 ton alfalfa at $12.50 per ton	17.90	
3 tons silage at $3.50 per ton	10.50	
.01 ton mixed hay at $10.00 per ton	.10	
*Pasture for 14 ewes at $1.00 per head	14.00	
		$66.72

Cr.

†46.5 pounds gain on ewes at 3½c per pound	$ 1.63	
116 pounds wool at 23c per pound	26.68	
		$28.31
Net cost of feed required to produce 681.5 lbs. of lamb		38.41
Net cost of feed required to produce a pound of lamb, live weight		.056

*Estimated.

†The ewes weighed 46.5 pounds more on April 1, 1912, than on the same date a year previous. This gain in live weight is valued at 3½ cents per pound.

Table XIII shows that the total cost of all the feed fed to the lambs and of all the feed required to maintain the ewes for a year, after deducting the value of the gain in live weight and of the wool produced by the ewes, was 5.6 cents per pound. It should be

noticed that in calculating the cost per pound, no credit is given for the weight of the two lambs that died, while the feed eaten by these two lambs and by their dams is charged. These lambs that died had practically reached a marketable weight, one weighing 40 pounds and the other 50 pounds, and it is perhaps no more than fair that the weight of these two lambs be included in the total weight, which would decidedly lower the cost of feed required to produce a pound of gain in live weight.

SALE OF LAMBS: FINANCIAL STATEMENT

The lambs were sold for 35 cents per pound, dressed. The following financial statement shows the amount remaining after deducting the total cost of the feed consumed from the total receipts from the sale of the lambs, wool and pelts.

DR.		
Total cost of feed and pasture	$ 66.72	
Express on lambs shipped to Columbus	3.80	
		$ 70.52
CR.		
343 pounds lamb at 35c per pound	$120.05	
14 pelts at 30c	4.20	
116 pounds wool at 23c per pound	26.68	
46.5 pounds gain on ewes at 3½c per pound	1.63	
		$152.56
Balance above the cost of feed and marketing:		
Total		$ 82.04
Per lamb		6.84

LAMBS RAISED DURING THE WINTER OF 1912-13

Pages 202-205 of this bulletin report the results of an experiment with hothouse lambs conducted in 1912-13. The following pages show the total cost of feed required to produce the 32 lambs used in this experiment, together with 8 other lambs of similar breeding but slightly younger in age. The lambs were slaughtered at different dates, from February 5 to March 17, 1913, as they reached the desired weight and degree of finish. Four lambs were not sold because of demoralized shipping facilities when they were ready to slaughter.

INDIVIDUAL GAINS

Table XIV shows the date of birth, the date slaughtered, and the age and weight when slaughtered, also the daily gain and the total gain made by the lambs from the time of birth until

they were slaughtered. It may be seen from this table that the total live weight of the 40 lambs was 2,171.5 pounds. The gains shown in this table do not include the birth weights of the lambs.

TABLE XIV. Individual weights and gains made by hothouse lambs, 1912-13.

No.	Date of birth	Date slaughtered	Age when slaughtered	Weight when slaughtered	Gain per day* from birth until slaughtered
			Days	Lbs.	Lbs.
1	Oct. 23	Feb. 17	117	53.0	.389
2	Nov. 18	" 17	91	55.0	.500
2001	Oct. 26	Mch. 3	128	52.0	.351
2002	Nov. 28	" 17	109	53.0	.390
2003	Dec. 7	" 17	100	57.5	.486
2004	Nov. 5	" 3	118	52.0	.369
2006	Dec. 3	" 17	104	58.5	.471
2008	Nov. 27	" 17	110	57.5	.436
2009	" 2	Feb. 17	107	54.0	.416
2014	Dec. 6	Mch. 10	94	55.0	.468
2018	Oct. 29	Feb. 5	99	67.0	.596
2021	Nov. 3	" 17	106	52.5	.417
2029	" 3	" 17	106	60.0	.476
2032	Oct. 31	" 5	97	52.0	.448
2033	" 15	" 5	113	55.0	.411
2040	Dec. 11	Mch. 17	96	59.0	.516
2048	Nov. 23	" 10	107	54.0	.458
2050	" 23	" 10	107	59.0	.472
2059	" 25	" 10	105	57.0	.448
2063	Oct. 20	Feb. 17	120	53.5	.371
**2071	Nov. 28	.....	...	.....	.....
2074	Dec. 3	Mch. 17	104	53.0	.423
**2076	Oct. 23	.....	...	.....	.....
2084	Nov. 24	Mch. 17	113	56.5	.420
2087	Oct. 16	Feb. 5	112	59.0	.437
2088	" 21	Mch. 10	140	54.0	.314
2097	Dec. 17	" 17	90	57.5	.528
**2112	Nov. 22	.....	...	.....	.....
2113	" 21	Mch. 10	109	55.0	.413
2117	Oct. 7	Feb. 5	121	52.5	.368
2123	Nov. 4	" 5	93	52.5	.473
2124	Oct. 28	Mch. 3	126	51 0	.353
2125	Nov. 1	Feb. 5	96	52.0	.458
2129	" 1	" 17	108	50.0	.389
2142	Oct. 21	Mch. 3	133	57.0	.316
2145	" 14	Feb. 17	126	55.0	.353
2147	" 29	" 5	99	57.0	.490
2174	Dec. 7	Mch. 10	93	54.0	.478
2181	" 2	" 10	98	52.0	.418
**2222	Oct. 19	.....	...	.....	.....
Weight of 36 lambs slaughtered.....				1,984.5	
Weight of 4 lambs not slaughtered.....				187.0	
Total weight of 40 lambs.....				2,171.5	

*In calculating the daily gain per lamb, the birth weight was deducted from the weight when slaughtered.

**These lambs were not slaughtered. Their combined weight March 17, 1913, was 187 pounds.

SHRINK IN DRESSING

These lambs were "hog dressed" as is required by the New York market to which they were consigned. All of the viscera except the heart, liver and kidneys were removed. The pelts and heads were left on and the feet removed at the joint nearest the hoof. The carcass was spread by "backsets" and the caul spread over the parts of the carcass where the flesh was exposed. Table XV, showing the average live and dressed weights is of interest to show the amount the lambs shrank in dressing as described above.

TABLE XV. Live and dressed weights and shrink in dressing of 36 hothouse lambs, 1912-13.

Total live weight (empty)	Total dressed weight (cold)	Average shrink in dressing
Lbs. 1,984.5	Lbs. 1,352.5	Lbs. 17.6

TOTAL COST OF FEED, AND COST OF FEED PER POUND OF GAIN

Table XVI shows the amount of feed fed to the lambs, the total amount of feed required to maintain the forty ewes one year, the cost of this feed at ordinary farm prices, and the cost of feed per pound of live weight of lamb produced, after deducting the value of the wool produced by the forty ewes and after making allowance for their loss in live weight during the year.

TABLE XVI. Total amount and value of feed given to ewes and lambs, 1912-13.

	Corn	Oil-meal	Oats	Bran	Alfalfa	Soy-bean hay	Clover	Silage
Feed fed to ewes May 17 to July 18	356.8	....	....	....	.....	....	.....	.....
Feed fed to ewes and lambs, Oct. 25 to March 17	4,915.0	438.6	216.9	250.2	5 573.5	931.8	50.0	10,029.7
Feed fed to ewes after lambs were slaughtered until April, 1913	502.4	161.0	....	....	56.0	....	1,115.8	3,757.0
Total	5,774.2	599.6	216.9	250.2	5,629.5	931.8	1.165.8	13,786.7

DR.

5,774 pounds of corn at 56c per bushel	$57.74	
599.6 pounds oilmeal at $32.00 per ton	9.59	
216.9 pounds oats at 40c per bushel	2.71	
250.2 pounds bran at $24.00 per ton	3.00	
2.815 tons alfalfa at $12.50 per ton	35.19	
.466 ton soybean hay at $10.00 per ton	4.66	
.583 ton clover hay at $10.00 per ton	5.83	
6.893 tons silage at $3.50 per ton	24.13	
*Pasture for 40 ewes at $1.00 per head	40.00	
†69.5 pounds loss in live weight by ewes at 3½c per lb.	2.43	
		$185.23

CR.

317 pounds wool at 23c per pound	$72 91	
		$ 72.91
Net cost of feed required to produce 2,171.5 lbs of lamb		$112.37
Net cost of feed required to produce a pound of lamb, live weight		.052

*Estimated.

†The forty ewes weighed 69.5 pounds less on April 1, 1913, than on the same date the year previous. This loss in live weight is valued at 3½ cents per pound.

Table XVI shows that after crediting the ewes with the value of the wool produced and after deducting the value of the loss in live weight during the year, the total cost of the feed required to produce the lambs was 5.2 cents per pound.

SALE OF LAMBS: FINANCIAL STATEMENT

This lot of lambs was consigned to a commission firm in New York City, in five separate consignments, as they reached a desirable weight and proper degree of finish. The following financial statement shows that after crediting the ewes with the value of the wool produced during the year, the lambs returned, on an average, $4.08 after paying the expenses of marketing them and the cost of all the feed required to produce them.

DR.

Feed and pasture for 40 ewes and lambs	$182.85	
Express on lambs shipped to New York	27.38	
Commission	14.91	
69.5 pounds loss in live weight by ewes at 3½c per lb.	2.43	
		$227.57

CR.

February 11, 2 lambs at $9.00	$18.00	
" 11, 3 lambs at $8.50	25.50	
" 11, 3 lambs at $8.00	24.00	
" 21, 8 lambs at $9.00	72.00	
March 7, 4 lambs at $7.50	30.00	
" 14, 8 lambs at $7.75	62.00	
" 21, 5 lambs at $8.50	42.50	
" 21, 3 lambs at $8.00	24.00	
" 21, 4 lambs at $5.00*	20.00	
317 pounds Delaine wool at 23c per pound	72.91	
		$390.91
Balance above cost of feed and marketing:		
Total		$163.34
Per lamb		4.08

*The four lambs which were not sold on account of demoralized shipping facilities, when they were ready for market, were worth, at a conservative estimate, $5.00 apiece, on the farm.

LAMBS RAISED DURING THE AUTUMN OF 1912-13

If ewes can be induced to breed sufficiently early to have the lambs born in the late summer or early fall, the lambs may be nearly, if not quite, matured on pasture. This will materially reduce the feed bill, and will have the lambs ready for market at a time when good prices usually prevail. The following pages show the cost of feed required to raise 7 hothouse lambs in this manner during the summer and fall of 1912.

These lambs were sired by pure bred Southdown rams and were raised from grade Delaine ewes, very similar to those described on page 201. During the summer the ewes ran on bluegrass pasture until the lambs were born, when they were given the run of a 2¼ acre lot of an excellent stand of new clover seeding. Until November 25, when they were taken from the pasture and put into the barn, the ewes received no feed other than that furnished by the clover pasture. From November 2 to 25, the lambs were fed 54 pounds of corn and 25 pounds of alfalfa. After they were put into the barn the ewes were fed corn and soybean hay and the lambs were fed corn and alfalfa hay. One lamb, weighing 49 pounds, died on December 9, of a digestive disorder similar to that described on page 212. On December 18, four of the lambs were dressed and shipped to New York, and the other two were shipped to a Columbus hotel.

At the time the lambs were slaughtered they exceeded the most desirable weight for hothouse lambs at that season of the year. Had they been slaughtered two weeks earlier the cost of production would have been less and they probably would have commanded a higher price on the market. Table XVII is of interest to show the date of birth of the lambs and their age and weight when they were slaughtered.

TABLE XVII. Date of birth, age and weight of lambs slaughtered December 18, 1912.

No.	Date of birth	Age when slaughtered	Weight when slaughtered
		Days	Lbs.
343	August 12	128	54.0
2035	" 6	134	53.5
2053	July 18	143	58 0
2060	September 4	105	60 5
2077	July 29	142	60.0
2095*	" 29	....	....
2103	August 6	134	63.0
Total.....	..... .	...	349.0

*Died December 9, weight 49 pounds.

TOTAL COST OF FEED AND COST OF FEED PER POUND OF GAIN

Table XVIII shows the amount and cost of the feed fed to the lambs and the amount and cost of feed required to maintain the ewes for a year. It also shows the cost per pound of the lambs as measured by the cost of feed fed to both ewes and lambs, after deducting the value of the wool produced by the ewes. No credit has been given for the weight of the lamb that died. Since the feed eaten by this lamb and by its dam has been included in the above

calculation of the cost of production, perhaps it is no more than fair to credit the weight of this lamb, particularly since it had reached a marketable weight, 49 pounds. If this weight is added to the total weight of lambs produced, it reduces the cost of feed per pound of gain to 3.54 cents.

TABLE XVIII. Total amount and vulue of feed given to ewes and lambs, 1912-13.

	Corn	Oilmeal	Soybean hay	Alfalfa	Clover	Mixed hay	Silage
May 16 to July 18. Ewes.....	89.2	.. .	...	...	.....	....	.....
Nov. 2 to Dec. 18. Lambs...	154.2	... .	...	243	.. .	...	.....
Nov. 2 to Dec. 18. Ewes.....	110.0	.....	348	8	.....	92.0	.....
Dec. 19 to Apr. 9. Ewes.....	... .	181.8	...	84	420.3	15.8	2,772
Total..	353.4	181 8	348	335	420.3	107.8	2,772

353.4 pounds corn at 56c per bushel	$ 3.53
181.8 pounds oilmeal at $32.00 per ton	2.91
.174 ton soybean hay at $10.00 per ton	1.74
.168 ton alfalfa hay at $12.50 per ton	2.10
.21 ton clover hay at $10.00 per ton	2.10
.054 ton mixed hay at $10.00 per ton	.54
1.386 ton silage at $3.50 per ton	4.85
*Pasture for 7 ewes and lambs at $1.25 per ewe	8.75
	$26.52
54 pounds wool at 23c per pound	12.42
Net cost of feed required to produce 349 pounds of lamb	$14.10
Net cost of feed required to produce a pound of lamb, live weight	.04

*Estimated.

SALE OF LAMBS: FINANCIAL STATEMENT

Four lambs were dressed and shipped to a commission firm in New York City. The remaining two were shipped to a Columbus butcher and slaughtered and sold to a hotel for 35c per pound dressed. The butcher received the pelts as pay for dressing the lambs and delivering them to the hotel. The following financial statement shows the amount remaining after deducting the cost of the feed eaten by the lambs and the cost of the feed required to keep the ewes a year, from the receipts from sale of lambs and wool. Since there is no way of determining the amount of gain or loss in live weight by the ewes during the year when they were raising the lambs, no account is taken of this item.

Dr.		
Cost of feed and pasture	$26.52	
Express on 2 lambs shipped to Columbus	1.49	
Express on 4 lambs shipped to New York	3.00	
Commission on lambs shipped to New York	1.60	
		$32.61
Cr.		
December 24, 4 lambs at $8.00	$32.00	
" 24, 2 lambs, 58 pounds, at 35c	20.30	
54 pounds Delaine wool at 23c per pound	12.42	
		$64.72
Balance above cost of feed and marketing:		
Total		$32.11
Per lamb		5.35

The foregoing test shows something of the economy of producing hothouse lambs on pasture. Table XVI, p. 218, shows that the cost of feed required per pound of lamb produced was 5.2 cents per pound when the lambs were produced in the barn, while Table XVIII, p. 221 shows that when the lambs were raised on pasture the greater part of their lives, the cost of feed was but 4 cents per pound of lamb produced. This is a point deserving attention from hothouse lamb producers, particularly in the southern part of the state where pastures may be used late in the fall. In frequent cases there are fields of aftermath to be plowed in the spring which will furnish excellent pasture and produce cheap gains. New clover seeding may be used for the same purpose if not pastured too closely so as to injure the stand. Bluegrass pastures, if green and succulent, may be used to good advantage, but frequently in the fall they are either burned by dry weather or are pastured off closely and should be supplemented with pasture of another nature. This may be accomplished by using such crops as rape or rye. If these crops are sown in silage corn they frequently will make a good growth and furnish an abundance of pasture after the corn is removed. The extra amount of labor and expense involved in sowing such crops to furnish fall pasture is no greater than that required to feed the ewes and lambs in the barn.

SUMMARY

In two experiments, a grain ration of corn, 4 parts, and oilmeal, 1 part, fed to the ewes in connection with silage, clover and alfalfa hay, produced slightly larger and slightly cheaper gains on the lambs than did a grain ration composed of corn, 5 parts; oats, 2 parts; bran, 2 parts; and oilmeal, 1 part. (See pages 204, 205 and 207.)

In one experiment the corn, oats, bran and oilmeal ration produced a slightly larger gain on the ewes than did the corn and oilmeal ration. (See p. 204.) In the other experiment the ewes fed the corn and oilmeal ration made a slight gain, while those fed the corn, oats, bran and oilmeal ration made a slight loss. (See p. 207.)

The two rations fed to the ewes produced no noticeable difference in the finish on the lambs. (See p. 205.)

A grain ration of corn alone, fed in connection with alfalfa hay to winter lambs produced a slightly larger gain than did a grain ration of corn, 5 parts; oats, 2 parts; bran, 2 parts; and oilmeal, 1 part. The cost of the gain produced by each ration was practically the same. (See pages 209 and 210.)

The lambs fed corn alone as a grain ration were in higher condition than were those fed the mixed grain ration. (See p. 211.)

Hothouse lambs, born in July and August and maintained on clover pasture and a small amount of grain until November 25 and then fed in the barn, were produced at a smaller cost for feed than were lambs born in the fall and raised in the barn during the winter. (See pages 218 to 222.)